



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 20, 2017

Ms. Theresa Ballaine, Manager
Rio Algom Mining, LLC
PO Box 218
Grants, NM 87020

**SUBJECT: AMBROSIA LAKE FACILITY – REQUEST FOR CESSATION OF
 COMPONENTS OF THE ENVIRONMENTAL MONITORING PROGRAM**

Ms. Ballaine:

By letter dated August 16, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16242A149), Rio Algom Mining, LLC (RAML) requested U.S. Nuclear Regulatory Commission (NRC) approval to discontinue components of the environmental monitoring program at the Ambrosia Lake Facility. Specifically, RAML requested to discontinue the following routine monitoring components:

1. Quarterly airborne radioparticulate sampling
2. Quarterly airborne radon-222 sampling
3. Quarterly environmental dose monitoring using passive dosimeters at air sampling locations
4. Quarterly vegetation sampling at air sampling locations
5. Annual soil sampling at air sampling locations
6. Annual sediment sampling

The NRC staff reviewed RAML's request, and based on this review, provided a request for additional information by letter dated December 14, 2016 (ADAMS Accession No. ML16344A027). As stated in the December 14, 2016, letter, the staff has determined that RAML could make the above proposed changes to its monitoring program without prior NRC approval, as discussed in the enclosed Technical Evaluation Report (TER); however, the NRC staff had no concern with terminating the monitoring components numbered 3 through 6. By letter dated January 13, 2017, RAML provided a response to the request for additional information (ADAMS Accession No. ML17019A348). Based on the information provided on January 13, 2017, that demonstrates radioactive particulates have negligible impact to offsite dose, the staff also has no concern with cessation of radioactive particulate sampling, number 1 above. However, the NRC staff has additional comments related to the justification for certain parameters in the RAML dose calculation for dose due to radon (Rn) and its progeny. Because the dose to the nearest resident may be a significant fraction of the limit, staff are requesting that the Rn monitoring be continued while the methodology for calculating off-site dose be either modified, to reflect current NRC methods for determining dose from Rn exposure, or an acceptable justification provided for using alternative methods or parameters when making this determination. The enclosed TER documents the NRC staff's review and comments.

In separate correspondence dated August 18, 2016 (ADAMS Accession No. ML16238A193), RAML informed the staff of RAML's intention to eliminate security officer's presence at its licensed Ambrosia Lake facility. RAML's rationale is that most of the licensed radioactive material has been consolidated and covered in accordance with NRC approved plans. RAML plans that future security will include barbed wire fence with locked gates and signage and inspection of the gates on a monthly basis. The staff has no concerns with RAML's action to eliminate the security officer's presence at the facility because the status of the radioactive material at the site is such that the security of the site can be maintained without the need to have a security officer on site.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of ADAMS. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

If you have any questions concerning this letter, please contact Varughese Kurian, either by telephone at (301) 415-7426, or by e-mail at Varughese.Kurian@nrc.gov.

Sincerely,

/RA/

Stephen Koenick, Chief
Materials Decommissioning Branch
Division of Decommissioning, Uranium Recovery,
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Docket No.: 40-8905
License No.: SUA-1473

Enclosure:
Technical Evaluation Report

SUBJECT: AMBROSIA LAKE FACILITY – REQUEST FOR CESSATION OF
COMPONENTS OF THE ENVIRONMENTAL MONITORING PROGRAM,
DATED DECEMBER 20, 2017

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Technical Evaluation Report
Rio Algom Mining LLC, Ambrosia Lake Facility: Cessation of Environmental Monitoring Program Components and Elimination of Security Officer on Site

Cessation of Environmental Monitoring Program Components

By letter dated August 16, 2016 (ADAMS Accession No. ML16242A149), Rio Algom Mining, LLC (RAML) requested U.S. Nuclear Regulatory Commission (NRC) approval to discontinue components of the environmental monitoring program at the Ambrosia Lake Facility. Specifically, RAML requested to discontinue the following routine monitoring components:

1. Quarterly airborne radioparticulate sampling
2. Quarterly airborne radon-222 (Rn) sampling
3. Quarterly environmental dose monitoring using passive dosimeters at air sampling locations
4. Quarterly vegetation sampling at air sampling locations
5. Annual soil sampling at air sampling locations
6. Annual sediment sampling.

The NRC staff reviewed the submittal and, while generally recognizing the relative stability of environmental results, had questions with respect to the reported air monitoring. The staff sent a request for additional information to RAML by letter dated December 14, 2016 (ADAMS Accession No. ML16344A027). Also included in the letter was the staff's determination that RAML could make the proposed changes to its monitoring program without prior NRC approval. This staff determination was based on conditions in the RAML license (see Amendment 61, dated November 3, 2010, ADAMS Accession No. ML102220343). License Condition 10 indicates that the environmental monitoring program will be reviewed consistent with License Condition 14. In addition, License Condition 10 narrowly defines program element changes that require prior NRC approval as limited to "Any changes to the mill circuit ... shall require approval by the NRC in the form of a license amendment." License Condition 14 describes that "All [standard operating procedures] SOPs shall be reviewed annually to update procedures and be approved by the [Radiation Safety Officer] RSO to ensure that proper radiation protection principles are being applied." Thus, changes to the environmental monitoring program would not require NRC approval. The letter did inform RAML that the NRC staff does appreciate being provided the opportunity to review and comment on the proposed changes and that the NRC staff had no concerns with the discontinuance of monitoring components 3 through 6 as numbered above.

The reason for the request for additional information was because, after review of Figures 2-1 and 2-2 of the August 16, 2016 submittal, it appeared that the potential Rn dose to members of the public may exceed 100 mrem/y based on the difference between Rn levels indicated at some stations. Staff specifically noted that the background station was not designated in the submittal. In addition, the submittal's Table 2 values for radioactive particulates being monitored were stated to be the most conservative of the 10 CFR 20, Appendix B, Table 2 values for airborne effluents. This may not be accurate in all cases and could potentially cause a significant change in the estimated exposure from airborne particulate.

To clarify the staff's concern, the 10 CFR 20, Appendix B, Table 2, Col. 1 value for Rn-222 "with daughters present" is 0.1 pCi/L. This value corresponds to roughly 50 mrem/y for a receptor specified in the regulations. If it is assumed that the Rn daughters are present at only half of the assumed equilibrium level, the Table 2 value would then correspond to roughly 25 mrem/y.

Enclosure

However, the figures staff reviewed indicate that the net Rn-222 concentrations could be more than an order of magnitude greater than this value which would exceed the public dose limit.

RAML responded by letter dated January 13, 2017 (ADAMS Accession No. ML17019A348). In that response, RAML clarified that the substation sampling station represented background for the site while the Section 17 station represented the closest resident to the site. RAML described how it calculates the public dose and included results for year 2015. RAML calculated a dose due to radon and its progeny of 24 mrem/y. The total dose to the nearest resident (including that due to radon, particulates, and external dose) was calculated to be 28 mrem/y.

The NRC staff notes two parameters of the RAML dose calculation that differ significantly from NRC's draft Interim Staff Guidance (*FSME Interim Staff Guidance FSME-ISG-01: Evaluations of Uranium Recovery Facility Surveys of Radon and Radon Progeny in Air and Demonstrations of Compliance with 10 CFR 20.1301, Revised Draft Report for Comment*, March 2014, (ADAMS Accession No. ML13310A198). In its calculation of dose due to radon and its short-lived progeny, RAML includes an occupancy factor of 0.75, whereas the NRC draft guidance recommends an occupancy factor of 1.0 (100% occupancy, which is bounding). RAML did not provide justification that this occupancy factor applies to the specific members of the public considered in the calculation. For the radon progeny equilibrium factor, RAML stated that a value of 0.21 is used, whereas the NRC draft guidance recommends an equilibrium value of 0.5 for general applicability to residential exposures. RAML did not provide justification that this value of equilibrium factor would be applicable to the receptor. The NRC staff notes, in particular, that a value of 0.21 would be unreasonably low if the exposed member of the public is exposed indoors, for example in their residence.

The NRC staff independently calculated the public dose due to radon and its progeny with changes to the two parameters to use the values recommended by NRC's draft guidance. RAML included the radon in air concentrations at the substation and Section 17 locations for 2015. Based on these concentrations, the net (i.e., above background), annual average radon in air concentration for Section 17 was 0.3 pCi/L. With this concentration and the revised parameter values (occupancy factor of 1.0 and equilibrium factor of 0.5), the NRC staff calculated an estimated dose of 75 mrem/y due to radon and its progeny. This level is a significant fraction of the public dose limit of 100 mrem/y.

In addition, the staff noted that one dose conversion factor (mrem per uCi/ml) listed in the 2015 work sheet for determining dose from exposure to radioactive particulates was less conservative, by roughly a factor of two, than claimed for the particular radionuclide (i.e., Th-230). However, this would not significantly alter the estimated dose from radioactive particulates. In other instances, the dose conversion factors were either conservative or consistent with the most restrictive current 10 CFR 20, Appendix B, Table 2 values. As such, staff concluded that the information in Table 2 of the initial submittal was most likely in error while the calculation of exposure from the radioactive particulate appeared reasonable as well as having negligible impact (less than 1 mrem/y dose) to the nearest offsite receptor.

Based on the information provided by letter dated January 13, 2017, that demonstrates radioactive particulates have negligible impact to offsite dose, the NRC staff also have no concerns regarding cessation of radioactive particulate sampling (number 1 above). However, the NRC staff does have a concern with the Rn monitoring that is being performed (number 2 above).

The staff found that RAML did not justify certain parameters in its dose calculation for dose due to radon and its progeny. The NRC staff's independent evaluation found the dose to the nearest resident to be within the public dose limit but at a significant fraction of the limit. For this reason, staff are requesting that the Rn monitoring be continued while the methodology for calculating off site dose is modified, to reflect current NRC methods for determining dose from Rn exposure, or an acceptable justification is provided for using alternative methods or parameters.

Principal Contributors:

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